User Manual

Edition: 2012-10-04

Draco
KVM Extender

Model:
K474 Series

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1 About This Manual

1.1 Scope

This manual describes how to install your KVM Extender, how to operate it and how to perform trouble shooting.

1.2 Validity

This manual is valid for all devices listed on the front page. The product code is printed on the base of the devices.

1.3 Cautions and Notes

The following symbols are used in this manual:

This symbol indicates an important operating instruction that should be followed to avoid any potential damage to hardware or property, loss of data, or personal injury.

This symbol indicates important information to help you make the best use of this product.

This symbol indicates best practice information to show recommended and optimal ways to use this product in an efficient way.

2 Safety Instructions

To ensure reliable and safe long-term operation of your KVM Extender please note the following guidelines:

Installation

- ➔ Only use in dry, indoor environments.
- ➔ The KVM Extender and the power supply units can get warm. Do not situate them in an enclosed space without any airflow.
- ➔ Do not place the power supply directly on top of the device.
- ➔ Do not obscure ventilation holes.
- ➔ Only use power supplies originally supplied with the product or manufacturer-approved replacements. Do not use a power supply if it appears to be defective or has a damaged chassis.
- ➔ Connect all power supplies to grounded outlets. In each case, ensure that the ground connection is maintained from the outlet socket through to the power supply's AC power input.
- ➔ Do not connect the link interface to any other equipment, particularly network or telecommunications equipment.
- ➔ Take any required ESD precautions.

Repair

- ➔ Do not attempt to open or repair a power supply unit.
- ➔ Do not attempt to open or repair the KVM Extender. There are no user serviceable parts inside.
- ➔ Please contact your dealer or manufacturer if there is a fault.

3 Description

3.1 Application

The KVM Extender is used to increase the distance between a source (computer, CPU) and its console (keyboard, mouse, and other peripheral devices).

The KVM Extender is designed for use with Cat X (Twisted Pair) interconnect cables or fiber interconnect cables.

The KVM Extender with Cat X interconnect cables is unsuitable for connection between buildings where a fiber optic based product should be used instead.

The KVM Extender with fiber interconnect cables can also be used with applications in environments which are difficult in electromagnetical aspects. Electromagnetical interference can limit the maximum distance und reliability.

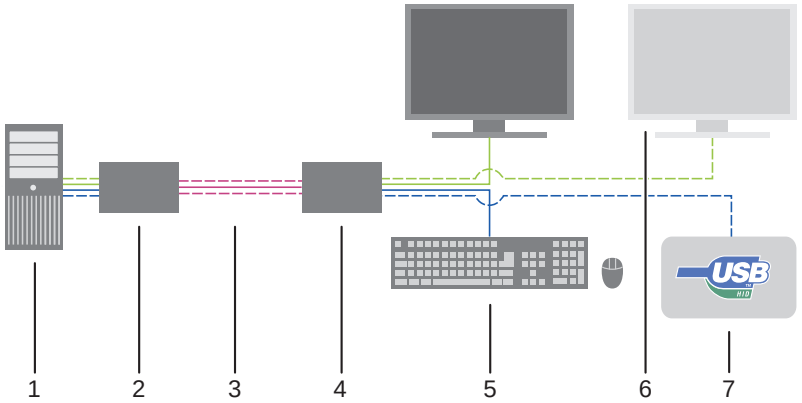
3.2 System Overview

The KVM Extender consists of at least one CPU module and one CON module. The various modules are summarized respectively in a vario chassis (2-fold, 4-fold or 6-fold) at CPU site and CON site (CPU and CON unit).

The CPU module is connected directly to the source (computer, CPU) using the supplied cables.

The CON module is connected to the console (monitor, keyboard and mouse).

The CPU Unit and the CON modules communicate with each other through the interconnect cables.



System Overview

1 Source (computer, CPU)
2 KVM Extender CPU Unit
3 Interconnect cable
4 KVM Extender CON Unit
5 Console (monitor, keyboard, mouse)
6 Second monitor (option, only with Dual-Head devices)
7 USB-HID devices (option, only with 4x USB-HID devices)

See Chapter 4.3, Page 38 for installation examples.

3.3 Product Range

3.3.1 Part Numbers

Part numbers for Connections via Cat X or Fiber Cable

All mentioned devices are available in the following versions:

- Connection via Cat X cable (x = "C")
- Connection via Single-mode fiber cable (x = "S")
- High speed connection (3.125 Gbit/s) via Single-mode fiber cable (x = "X")

Fiber devices can be used with Multi-mode and Single-mode cables (see Chapter 7.2.2, Page 51).

Part numbers for CPU Unit and CON Unit

The part numbers for the CPU Unit and the CON Unit can be derived from the part number of the complete device.

- CPU Unit: **L**474
- CON Unit: **R**474

All devices of the K474 series are technically compatible to the devices of the K477 series.

3.3.2 Complete Units

Model	Description
K474-1SHx	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 2x USB-HID
K474-1SEx	Single-Head-KVM Extender for 1x DVi-D Single Link (up to 1920x1200) with 2x USB-HID and 2x USB 2.0
K474-1SHxV	Single-Head-KVM Extender for 1x DVI-I (VGA / DVI) Single Link (up to 1920x1200), 2x USB-HID
K474-1SHxA	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 2x USB-HID and Analog Audio / Serial option
K474-1SExA	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200) with 2x USB-HID, 2x USB 2.0 and Analog Audio / Serial option
K474-1SHxD	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 2x USB-HID and Digital Audio Option

Model	Description
K474-1SExD	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200) with 2x USB-HID, 2x USB 2.0 and Digital Audio option
K474-1S4x	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 4x USB-HID
K474-1S4xA	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 4x USB-HID and Analog Audio / Serial option
K474-1S4xD	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 4x USB-HID and Digital Audio option
K474-1STx	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 2x USB-HID and 4x USB 2.0
K474-1STxA	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 2x USB-HID, Analog Audio / Serial option and 4x USB 2.0
K474-1STxD	Single-Head-KVM Extender for 1x DVI-D Single Link (up to 1920x1200), 2x USB-HID, Digital Audio option and 4x USB 2.0
K474-2S4x	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200), 4x USB-HID
K474-2SEx	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200) with 4x USB-HID and 2x USB 2.0
K474-2S4xA	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200), 4x USB-HID and Analog Audio / Serial option
K474-2SExA	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200) with 4x USB-HID, 2x USB 2.0 and Analog Audio / Serial option
K474-2S4xD	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200), 4x USB-HID and Digital Audio option
K474-2SExD	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200) with 4x USB-HID, 2x USB 2.0 and Digital Audio option
K474-2STx	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200), 4x USB-HID and 4x USB 2.0
K474-2STxA	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200), 4x USB-HID, Analog Audio / Serial option and 4x USB 2.0

Model	Description
K474-2STxD	Dual-Head-KVM Extender for 2x DVI-D Single Link (up to 1920x1200), 4x USB-HID, Digital Audio option and 4x USB 2.0
K474-4S8x	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200), 8x USB-HID
K474-4SEx	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200) with 8x USB-HID and 2x USB 2.0
K474-4S8xA	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200), 8x USB-HID and Analog Audio / Serial option
K474-4SExA	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200) with 8x USB-HID, 2x USB 2.0 and Analog Audio / Serial option
K474-4S8xD	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200), 8x USB-HID and Digital Audio option
K474-4SExD	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200) with 8x USB-HID, 2x USB 2.0 and Digital Audio option
K474-4STx	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200), 8x USB-HID and 4x USB 2.0
K474-4STxA	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200), 8x USB-HID, Analog Audio / Serial option and 4x USB 2.0
K474-4STxD	Quad-Head-KVM Extender for 4x DVI-D Single Link (up to 1920x1200), 8x USB-HID, Digital Audio option and 4x USB 2.0

3.3.3 KVM Extender Modules

Model	Description
L474-BSHx	Single-Head module for 1x DVI-D Single Link (up to 1920x1200) with 2x USB-HID
R474-BSHx	
L474-BSHxV	Single-Head module for 1x DVI-I (VGA / DVI) Single Link (up to 1920x1200) with 2x USB-HID
R474-BSHxV	

3.3.4 Upgrade Modules

Model	Description
L474-BXH	Upgrade module with 2x USB-HID
R474-BXH	
L474-BXE	Upgrade module with 2x USB 2.0
R474-BXE	
L474-BAX	Upgrade module with Analog Audio / Serial (bidirectional)
R474-BAX	
L474-BXP	Upgrade module with PS/2 (only available with upgrade module Analog Audio / Serial)
R474-BXP	
L474-BDX	Upgrade module with Digital Audio (unidirectional)
R474-BDX	
L474-BAH	Upgrade module with Analog Audio / Serial (bidirectional) and 2x USB-HID
R474-BAH	
L474-BUE	Upgrade module with Analog Audio (bidirectional) and 2x USB 2.0
R474-BUE	
L474-BAE	Upgrade module with Analog Audio / Serial (bidirectional) and 2x USB 2.0
R474-BAE	
L474-BDH	Upgrade module with Digital Audio (unidirectional) and 2x USB-HID
R474-BDH	
L474-BDE	Upgrade module with Digital Audio (unidirectional) and 2x USB 2.0
R474-BDE	
L474-BDD	Upgrade module with Digital Audio (bidirectional)
R474-BDD	
L474-BDA	Upgrade module with Digital Audio (unidirectional) and Analog Audio / Serial (bidirectional)
R474-BDA	
L474-BXTx	USB 2.0 upgrade module with 4x USB 2.0
R474-BXTx	

3.4 Upgrade Kits

Model	Description
474-VRMK	19"/1U rack mount kit for 2-, 4- and 6-fold chassis
474-VPLATE	Fastening strips for screw or snap on for 2-, 4- and 6-fold chassis
474-OPTRED	Retrofitting for redundant power supply option (without power supply) for 2- and 4-fold chassis
474-PSU2	Power supply for 2-fold chassis (spare or redundancy)
474-PSU4	Power supply for 4-fold chassis (spare or redundancy)
474-PSU6	Power supply for 6-fold chassis (spare or redundancy)
474-PSU21	Power supply for 6-fold-chassis (spare or redundancy)
474-BLND1	Blind plate 3U/4HP for 2-, 4- and 6-fold chassis
474-BLND2	Blind plate 3U/8HP for 2-, 4- and 6-fold chassis

The KVM Extenders and the provided power supply units can get warm, for this reason an installation in closed rooms without air circulation is not allowed. Please note that you will need at least 0.5 U (height unit) for the ventilation above the extenders, if you mount them into racks.

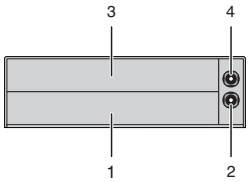
3.5 Accessories

Model	Description
026-2A	Serial cable 1.8 m (RS232)
247-U1	USB cable 1.8 m (Type A to B)
260-5G	International power supply unit 100...240VAC / 5VDC / 3 A
260-5U	International power supply unit 100...240VAC / 5VDC / 4 A
436-AA	VGA cable 1.8 m (VGA to DVI-I)
436-ID	DVI-D cable 1.8 m (DVI-D)
445-2X	DVI-D splitter cable
445-2H	DVI-D splitter cable, HDCP compliant
455-CK	Stereo jack cable 1.6 m (3.5 mm Stereo)
455-CR	RCA cable 2.5 m (Cinch male connector)
455-CT	TOSLINK cable 1.8 m (F05 male connector)
455-CX	Mini-XLR cable 1.8 m (3 pole)

3.6 Device Views

3.6.1 2-fold Vario Chassis 1

CPU and CON Unit



Rear View

1 Slot for modules #1

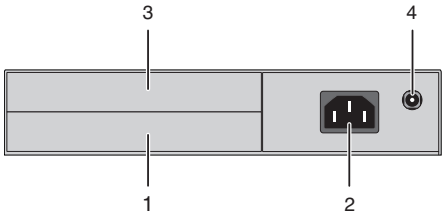
2 Connect to 5VDC power supply (standard)

3 Slot for modules #2

4 Connect to 5VDC power supply (redundancy, optional)

3.6.2 2-fold Vario Chassis 2

CPU and CON Unit



Rear View

1 Slot for modules #1

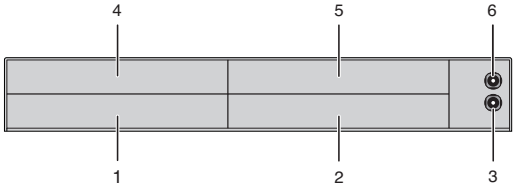
2 Connect to power supply (standard)

3 Slot for modules #2

4 Connect to 5VDC power supply (redundancy)

3.6.3 4-fold Vario Chassis

CPU and CON Unit



Rear View

1 Slot for modules #3

2 Slot for modules #1

3 Connect to 5VDC power supply (standard)

4 Slot for modules #4

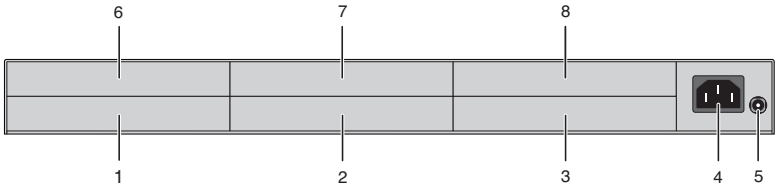
5 Slot for modules #2

6 Connect to 5VDC power supply (redundancy, optional)

For operation with three KVM Extender CON modules and a USB 2.0 CON module in a 4-fold vario chassis, an external power supply unit at the second 5VDC connector is explicitly necessary. In this case, redundancy is inapplicable.

3.6.4 6-fold Vario Chassis

CPU and CON Unit



Rear View

1 Slot for modules #5

2 Slot for modules #3

3 Slot for modules #1

4 Connect to power supply (standard)

5 Connect to 5VDC power supply (standard)

6 Slot for modules #6

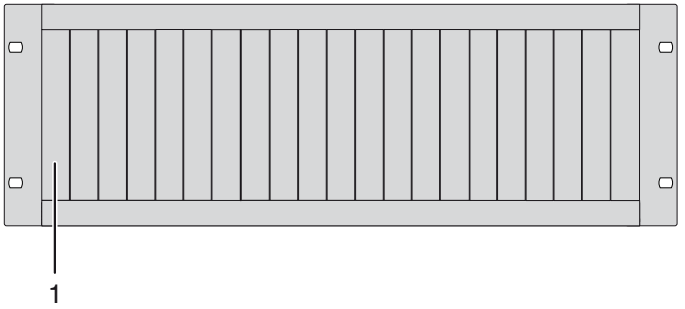
7 Slot for modules #4

8 Slot for modules #2

For operation with KVM Extender modules in a 6-fold vario chassis, an external power supply unit at the 5VDC connector is explicitly necessary. In this case, redundancy is inapplicable.

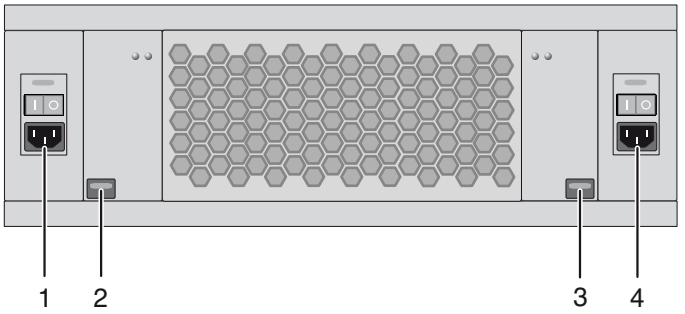
3.6.5 21-fold Vario Chassis

CPU and CON Unit



Front View

1 Slots for modules #1 - #21



Rear View

1 Connect to power supply 2

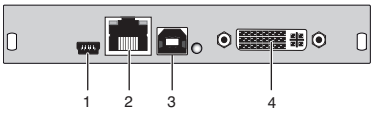
2 Locking for power supply 2 (redundancy)

3 Locking for power supply 1 (standard)

4 Connect to power supply 1

3.6.6 Model L- / R474-BSHC

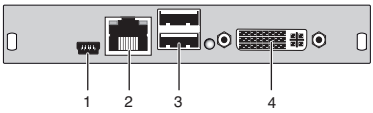
CPU Module



Rear View

1 Service port
2 Connect to interconnect cable
3 To CPU: USB-HID
4 To CPU: DVI-D

CON Module

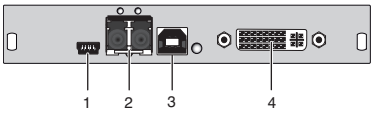


Rear View

1 Service port
2 Connect to interconnect cable
3 Connect to USB-HID devices
4 Connect to DVI monitor

3.6.7 Model L- / R474-BSHS / -BSHX

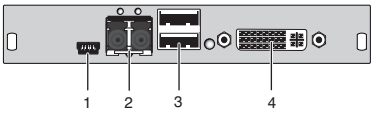
CPU Module



Rear View

1 Service port
2 Connect to interconnect cable
3 To CPU: USB-HID
4 To CPU: DVI-D

CON Module

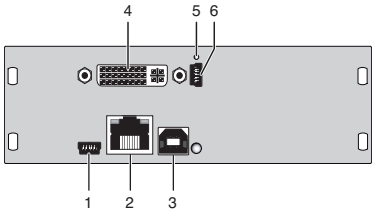


Rear View

1 Service port
2 Connect to interconnect cable
3 Connect to USB-HID devices
4 Connect to DVI monitor

3.6.8 Model L- / R474-BSHCV

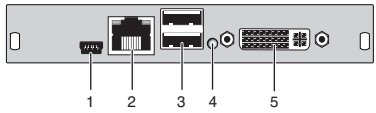
CPU Module



Rear View

1 Service port (KVM)
2 Connect to interconnect cable
3 To CPU: USB-HID
4 To CPU: DVI-I (VGA / DVI)
5 IR receiver for remote control
6 Service port (DVI-I)

CON Module

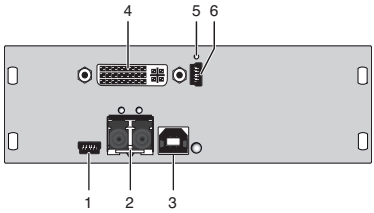


Rear View

1 Service port
2 Connect to interconnect cable
3 Connect to USB-HID devices
4 IR receiver for remote control
5 Connect to DVI monitor

3.6.9 Model L- / R474-BSHSV / -BSHXV

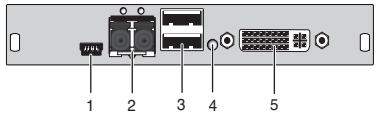
CPU Module



Rear View

1 Service port (KVM)
2 Connect to interconnect cable
3 To CPU: USB-HID
4 To CPU: DVI-I (VGA / DVI)
5 IR receiver for remote control
6 Service port (DVI-I)

CON Module

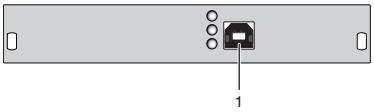


Rear View

1 Service port
2 Connect to interconnect cable
3 Connect to USB-HID devices
4 IR receiver for remote control
5 Connect to DVI monitor

3.6.10 Model L- / R474-BXH

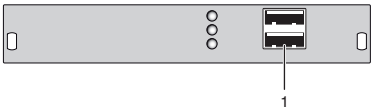
CPU Module



Rear View

1 To CPU: USB-HID

CON Module

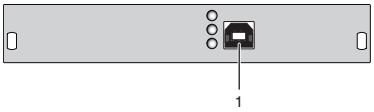


Rear View

1 Connect to USB-HID devices

3.6.11 Model L- / R474-BXE

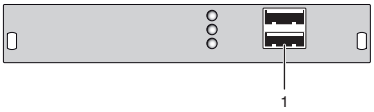
CPU Module



Rear View

1 To CPU: USB 2.0

CON Module

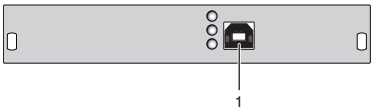


Rear View

1 Connect to USB 2.0 devices

3.6.12 Model L- / R474-BUE

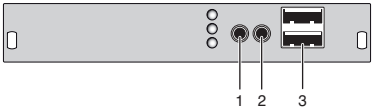
CPU Module



Rear View

1 To CPU: USB 2.0

CON Module



Rear View

1 Audio IN

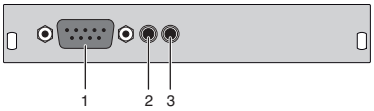
2 Audio OUT

3 Connect to USB 2.0 devices

When using USB audio within a KVM matrix, instant switching is not possible due to the deregistration and registration process of the USB.

3.6.13 Model L- / R474-BAX

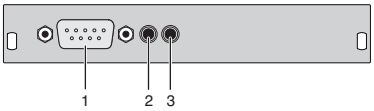
CPU Module



Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT

CON Module

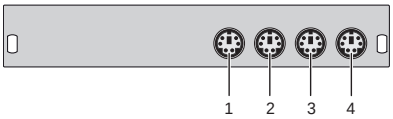


Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT

3.6.14 Model L- / R474-BXP

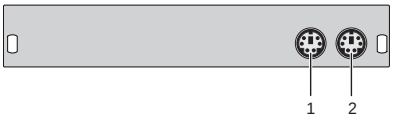
CPU Module



Rear View

1 Connect to local PS/2 mouse
2 Connect to local PS/2 keyboard
3 To CPU: PS/2 mouse
4 To CPU: PS/2 keyboard

CON Module



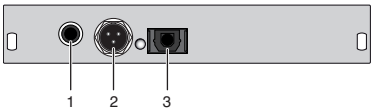
Rear View

1 Connect to PS/2 mouse
2 Connect to PS/2 keyboard

The upgrade module L- / R474-BXP is only available in combination with the upgrade modules L- / R474-BAX and –BAH. A separate slot is required for each module.

3.6.15 Model L- / R474-BDX

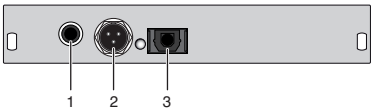
CPU Module



Rear View

1 S/PDIF input (RCA)
2 AES/EBU input (Mini-XLR)
3 S/PDIF input (TOSLINK)

CON Module

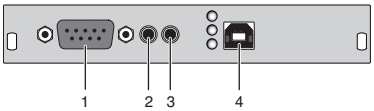


Rear View

1 S/PDIF output (RCA)
2 AES/EBU output (Mini-XLR)
3 S/PDIF output (TOSLINK)

3.6.16 Model L- / R474-BAH

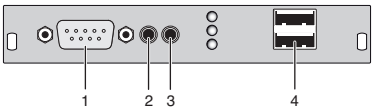
CPU Module



Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT
4 To CPU: USB-HID

CON Module

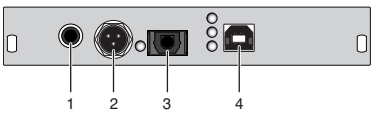


Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT
4 Connect to USB-HID devices

3.6.17 Model L- / R474-BDH

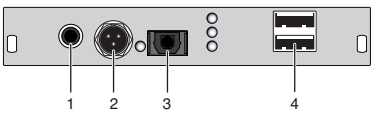
CPU Module



Rear View

1 S/PDIF input (RCA)
2 AES/EBU input (Mini-XLR)
3 S/PDIF input (TOSLINK)
4 To CPU: USB-HID

CON Module

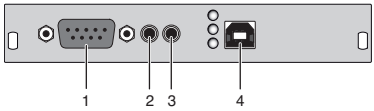


Rear View

1 S/PDIF output (RCA)
2 AES/EBU output (Mini-XLR)
3 S/PDIF output (TOSLINK)
4 Connect to USB-HID devices

3.6.18 Model L- / R474-BAE

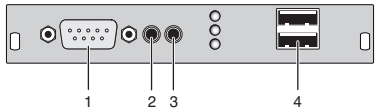
CPU Module



Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT
4 To CPU: USB 2.0

CON Module

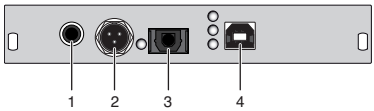


Rear View

1 Connect to serial (D-Sub 9)
2 Audio IN
3 Audio OUT
4 Connect to USB 2.0 devices

3.6.19 Model L- / R474-BDE

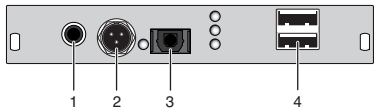
CPU Module



Rear View

1 S/PDIF input (RCA)
2 AES/EBU input (Mini-XLR)
3 S/PDIF input (TOSLINK)
4 To CPU: USB 2.0

CON Module

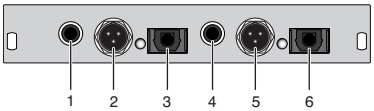


Rear View

1 S/PDIF output (RCA)
2 AES/EBU output (Mini-XLR)
3 S/PDIF output (TOSLINK)
4 Connect to USB 2.0 devices

3.6.20 Model L- / R474-BDD

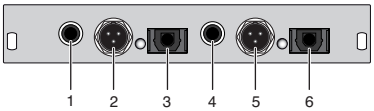
CPU Module



Rear View

1 S/PDIF input (RCA)
2 AES/EBU input (Mini-XLR)
3 S/PDIF input (TOSLINK)
4 S/PDIF output (RCA)
5 AES/EBU output (Mini-XLR)
6 S/PDIF output (TOSLINK)

CON Module

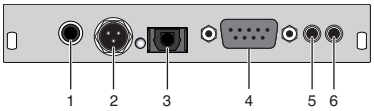


Rear View

1 S/PDIF output (RCA)
2 AES/EBU output (Mini-XLR)
3 S/PDIF output (TOSLINK)
4 S/PDIF input (RCA)
5 AES/EBU input (Mini-XLR)
6 S/PDIF input (TOSLINK)

3.6.21 Modell L- / R474-BDA

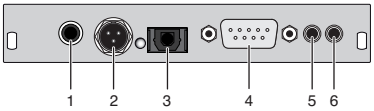
CPU Module



Rear View

1 S/PDIF input (RCA)
2 AES/EBU input (Mini-XLR)
3 S/PDIF input (TOSLINK)
4 Connect to serial (D-Sub 9)
5 Audio IN
6 Audio OUT

CON Module

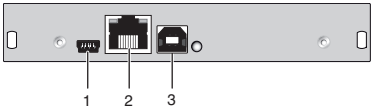


Rear View

1 S/PDIF output (RCA)
2 AES/EBU output (Mini-XLR)
3 S/PDIF output (TOSLINK)
4 Connect to serial (D-Sub 9)
5 Audio IN
6 Audio OUT

3.6.22 Modell L- / R474-BXTC

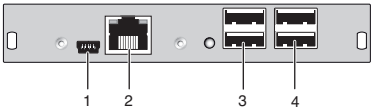
CPU Module



Rear View

1 Service port
2 Connect to interconnect cable
3 To CPU: USB 2.0

CON Module

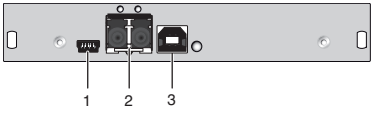


Rear View

1 Service port
2 Connect to interconnect cable
3 Connect to USB 2.0 devices

3.6.23 Modell L- / R474-BXTS

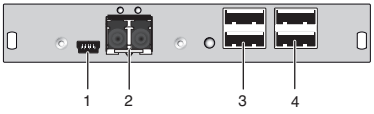
CPU Module



Rear View

1 Service port
2 Connect to interconnect cable
3 To CPU: USB 2.0

CON Module



Rear View

1 Service port
2 Connect to interconnect cable
3 Connect to USB 2.0 devices

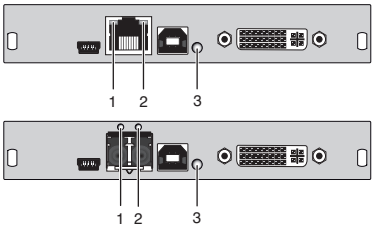
It is only allowed to use one USB 2.0 CON module per chassis.

3.7 Status LEDs

3.7.1 Status KVM Extender Module

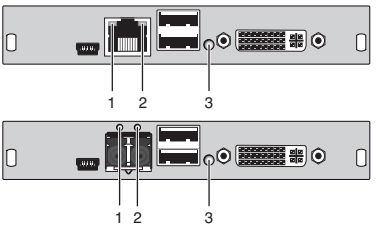
The KVM Extender module is fitted with a multi color LED on both sides for overall status indication and with two further LEDs on the back side for indication of the connection status.

CPU Module



Rear View

CON Module



Rear View

LED 1 and 2: Connection Status

Pos.	LED	Status	Description
1	**Failure LED** (green)	Off	Connection available
		On or Flashing	Connection failure (flashing for about 20 s following a connection failure)
2	**Status LED** (green)	Flashing	No connection via interconnect cable
		On	Connection available

LED 3: USB and Video Status

LED color		Description
Red		Device ready
Violet		Connection and USB signal (interconnect) available
Green		Connection and video signal available
Light Blue		Connection, USB and video signal available (operating status)

3.7.2 Status KVM Extender Module VGA / DVI-I

The KVM Extender module with VGA / DVI-I input is fitted with a multi-color LED on the front side of the CPU Unit for indication of connection status. Further information is available via on screen display (OSD) (see manual for the Media / DVI Converter K238-5V (Download)).

CPU Module

Front View

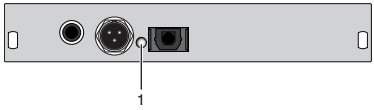
LED 1: Connection Status VGA / DVI-I

LED color		Description
Dark Red		No video signal; monitor not detected
Red		Video signal not supported; monitor not detected
Green		Video signal supported; monitor not detected
Blue		No video signal; monitor detected
Violet		Video signal not supported; monitor detected
Light Blue		Video signal supported; monitor detected

3.7.3 Status Upgrade Module Digital Audio

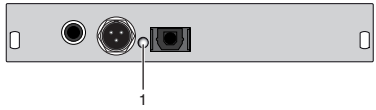
The upgrade module digital audio is fitted with a further multi-color LED on the rear side for indication of the connection status:

CPU Module



Rear View

CON Module



Rear View

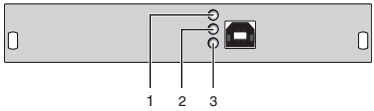
LED 1: Digital Audio Status

LED color		Description
Red		No signal
Light Blue		CPU Unit: S/PDIF signal (RCA) available
Violet		CPU Unit: AES/EBU signal (Mini-XLR) available
Blue		CPU Unit: S/PDIF signal (TOSLINK) available
Green		CON Unit: Signal available

3.7.4 Status Upgrade Module USB-HID

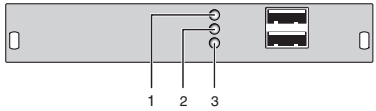
The upgrade module USB-HID is fitted with three further LEDs on the rear side for indication of the connection status:

CPU Module



Rear View

CON Module



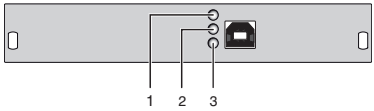
Rear View

Pos.	LED	Status	Description
1, 2	**Device LED** (orange)	Off	No USB-HID device or not supported USB device connected
		Flashing fast	USB-HID device active
		On	USB-HID device ready or KVM Extender in command mode
3	**Status LED** (orange)	Off	• No power supply voltage • CPU Unit: KVM Extender in command mode or no connection • CON Unit: Keyboard in command mode
		Flashing slowly	CON Unit: KVM Extender in command mode or no connection
		Flashing fast	Operating status

3.7.5 Status Upgrade module USB 2.0 embedded

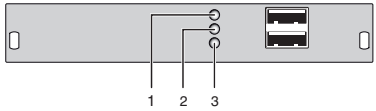
The upgrade module USB 2.0 embedded is fitted with three further LEDs on the rear side for indication of the connection status:

CPU Module



Rear View

CON Module



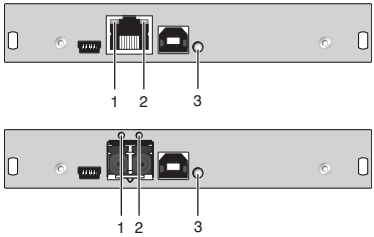
Rear View

Pos.	LED	Status	Description
1	**Status LED** (green)	Off	No USB 2.0 device connected
		Flashing slowly	USB 2.0 device connected
2	**Status LED** (green)	Off	No connection to source (computer, CPU) available
		Flashing slowly	• Connection to source (computer, CPU) available • No USB 2.0 device connected
		On	• Connection to source (computer, CPU) available • USB 2.0 device(s) connected
3	**Status LED** (green)	Off	No connection between CON and CPU module
		On	Connection between CON and CPU module available

3.7.6 Status Upgrade Module USB 2.0

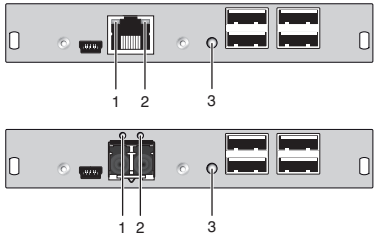
The upgrade module USB 2.0 is fitted with a multi color LED on both sides for overall status indication and with two further LEDs on the back side for indication of the connection status.

CPU Module



Rear View

CON Module



Rear View

Pos.	LED	Status	Description
1	**Failure LED** (green)	Off	Connection available
		On or Flashing	Connection failure (flashing for about 20 s following a connection failure)
2	**Status LED** (green)	Off	No connection via interconnect cable
		On	Connection available

LED 3: USB 2.0 Status

LED color		Description
Red		Device ready
Green		Only connection available, no USB 2.0 signal
Green / light blue flashing		Connection available, no USB 2.0 device connected
Light blue		Connection and USB 2.0 signal available (operating status)

4 Installation

4.1 Package Contents

Your extender package contains the following items:

KVM Extender:

- KVM Extender pair (CPU Unit and CON Unit) in the vario chassis
- 1x (redundancy 2x) 5VDC international power supply unit per KVM Extender unit
- 1x (redundancy 2x) country specific power cord
- Quick Setup
- DVI video cable (1.8 m, DVI-D male-to-male)

- USB cable (1.8 m, type A to type B)

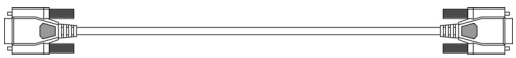
Additional content for KVM Extender module VGA (replaces DVI-D cable):

- VGA cable (1.8 m, VGA male to DVI-I male)

- Infrared remote control

Additional content for upgrade module Analog Audio / Serial:

- Serial cable (1.8 m, RS232 male connector)



- Stereo jack cable (1.6 m, 3.5 mm male connector)

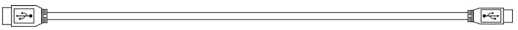
Additional content for upgrade module Digital Audio:

- RCA cable (2.5 m, Cinch male connector)

- TOSLINK cable (1.8 m, F05 male connector)

Additional content for upgrade module USB-HID:

- USB cable (1.8 m, USB type A to type B)



Additional content for upgrade module USB 2.0 embedded:

- USB cable (1.8 m, USB type A to type B)

Additional content for upgrade module USB 2.0:

- USB cable (1.8 m, USB type A to type B)

If anything is missing, contact your dealer.

4.2 System Setup

First time users are recommended to setup the system with the CPU Unit and the CON Unit in the same room as a test setup. This will allow you to identify and solve any cabling problems, and experiment with your system more conveniently.

➔ Please verify that interconnect cables, interfaces, and handling of the devices comply with the requirements (see Chapter 7, Page 44).

4.2.1 KVM Extender Setup

1. Switch off all devices.

CON Unit Installation

2. Connect your monitor(s), keyboard and mouse to the CON Unit.
3. Connect the CON Unit with the interconnect cable(s).
4. Connect the 5VDC power supply to the CON Unit.

CPU Unit Installation

5. Connect the source (computer, CPU) with the supplied cables to the CPU Unit. Please ensure the cables are not strained.
6. Connect the CPU Unit to the interconnect cable(s).
7. Connect the 5VDC power supply to the CPU Unit.
8. Power up the system.

To power up the system, the following sequence is recommended: Monitor – CON Unit – CPU Unit – source.

The basic module with VGA / DVI-I input is connected as mentioned above. For a complete and detailed description of the setup and configuration of the VGA option, see the manual of the Media- / DVI-Converter K238-5V (Download).

4.2.2 Setup of Upgrade Modules

The modules can be hot plugged.

Upgrade Module Analog Audio / Serial:

1. Connect the audio source with the CPU Unit (e.g. CPU audio output with audio input, CPU audio input with audio output).
2. Connect the audio output at the CON Unit with headphones or suitable speakers.
3. Connect the audio input at the CON Unit with a suitable microphone.

Upgrade Module Digital Audio:

1. Connect the digital audio source with the suitable audio input of the CPU Unit.
2. Connect the audio output of the CON Unit with suitable speakers or audio amplifiers.

If several active sources are connected, Mini-XLR input takes priority. The audio signal is available at all outputs.

Upgrade Module USB-HID:

1. Connect the CPU with the CPU Unit (USB-HID 2).
2. Connect the USB-HID devices with the CON Unit (Connect to USB-HID devices 2).

Upgrade Module USB 2.0 Embedded:

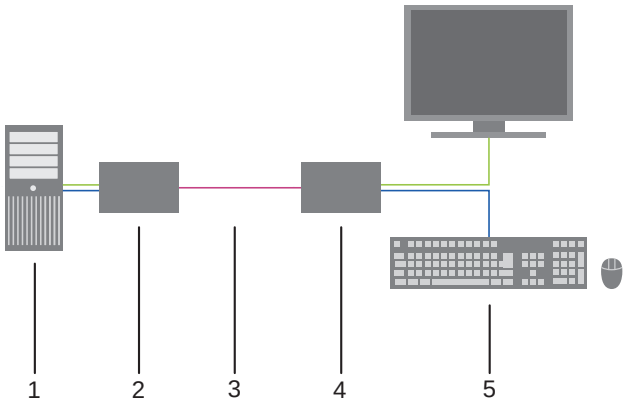
1. Connect the CPU with the CPU Unit (USB 2.0).
2. Connect the USB 2.0 devices with the CON Unit (Connect to USB 2.0 devices).

Upgrade Module USB 2.0:

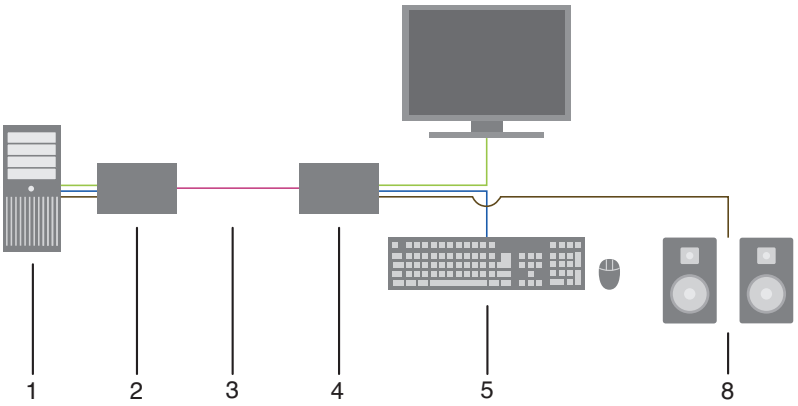
1. Connect the CPU with the CPU Unit (USB 2.0).
2. Connect the USB 2.0 devices with the CON Unit (Connect to USB 2.0 devices).

4.3 Example Applications

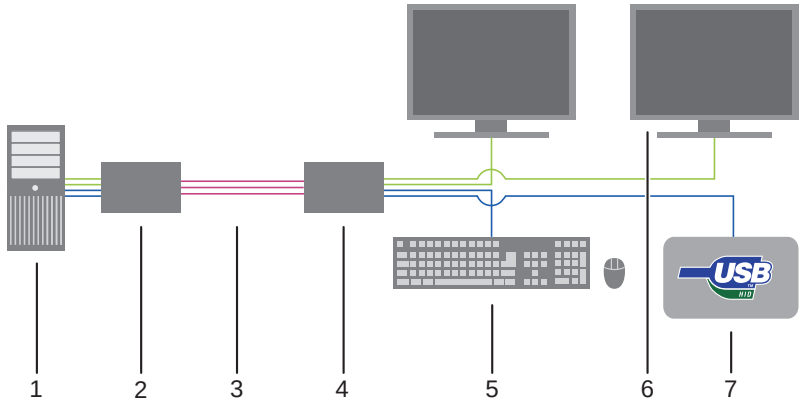
This section illustrates typical installations of KVM Extenders:



KVM Extender (Single-Head)



KVM Extender (Single-Head with Digital / Analog Audio)



KVM Extender (Dual-Head with 4x USB-HID)

1 Source (computer, CPU)
2 KVM Extender CPU Unit
3 Interconnect cable
4 KVM Extender CON Unit
5 Console (monitor, keyboard, mouse)
6 Second monitor (option, only with Dual-Head devices)
7 USB-HID devices (option, only with 4x USB-HID devices)
8 Audio sink (optional, only with devices with Analog Audio / Serial option or Digital Audio option)

5 Configuration

5.1 Transmission Parameters

The device operates with a proprietary compression method.

In default configuration, the device adapts dynamically to monitor resolution and image content. This configuration is suitable for almost all conditions and should only be modified if image quality is not fully satisfactory.

In exceptional cases there can appear detached "frame droppings" (loss of single pictures) or color effects.

5.2 DDC Settings

By default, the device transmits the factory preset DDC information to the CPU. This information is suitable in most cases.

The download of the DDC information of the console monitor can be performed during normal operation (see Chapter 6.1, Page 43).

For special requirements, DDC information can be retrieved and uploaded as a binary file at both the CPU Unit and the CON Unit.

Connect your computer with a USB mini cable to the service port of the CPU Unit or CON Unit.

The data area of the unit is now accessible as a flash drive "Extender".

Uploading DDC Information

Copy the binary file containing your specific DDC information to the flash drive of the CPU Unit or CON Unit.

The current DDC information is replaced.

Retrieving DDC Information

Copy the file "DDC-EDID.bin" on the flash drive of the CPU Unit to your computer.

To open the binary file, you have to install a suitable software, e.g. WinDDCwrite (Download), on your computer.

Reset to Factory DDC Information

Delete the file called "DDC-EDID.bin" on the flash drive of the CPU Unit.

By deleting this file, the factory DDC Information is restored.

5.3 Command Mode

During normal use, the console keyboard functions in the usual manner. However, for all KVM Extenders with USB-HID support, you can set the keyboard into a Command Mode by using a specific 'Hot Key' sequence. While in Command Mode, several functions are performed via keyboard commands. To exit Command Mode, press <Esc>.

While in Command Mode, the LEDs **Shift** and **Scroll** on the console keyboard will flash.

In Command Mode normal keyboard and mouse operation will cease. Only selected keyboard commands are available.

The following table lists the keyboard commands to enter and to exit Command Mode and to change the 'Hot Key' sequence:

Function	Keyboard Command
Enter Command Mode (default)	2x <Left Shift> / ('Hot Key')
Exit Command Mode	<Esc>
Change 'Hot Key' sequence	<current 'Hot Key'>, <c>, <new 'Hot Key' code>, <Enter> Until 2011-30-09: <Left Ctrl> + <Left Shift> + <c>, <'Hot Key' Code>, <Enter>

<Key> + <Key>	Press keys simultaneously
<Key>, <Key>	Press keys successively
2x <Key>	Press key quickly, twice in a row (similar to a mouse double-click)

The 'Hot Key' sequence to enter Command Mode can be changed. The following table lists the 'Hot Key' Codes for the available key sequences:

'Hot Key' Code	'Hot Key'
1	<Left Ctrl> + <Left Shift> + <i>
2	2x <Scroll>
3	2x <Left Shift>
4	2x <Left Ctrl>
5	2x <Left Alt>
6	2x <Right Shift>
7	2x <Right Ctrl>
8	2x <Right Alt>

5.4 Configuration File

The KVM Extender contains a configuration file (Config.txt) to set specific parameters and to read out device and video information. You can find it on the flash drive of the KVM Extender. The flash drive can be opened by a mini USB connection to a computer.

Die Konfigurationsdatei lässt sich mit allen gängigen Texteditoren bearbeiten.

The individual settings of the parameters are described in the respective chapters.

6 Operation

6.1 Download of DDC Information

By default, data from the internal DDC list is reported to the source (computer, CPU). If these settings do not lead to a satisfying result, the DDC information of the console monitor can be downloaded and stored internally. The devices have to be configured accordingly (see Chapter 5.2, Page 40).

On all KVM Extenders with USB-HID support, the user can load the DDC information of the console monitor via keyboard command under operating conditions.

1. Enter Command Mode with the 'Hot Key' (see Chapter 5.2, Page 40).
2. Press the key <a> to download the DDC information of the console monitor.

   The screen goes black for a short time.

   At the same time Command Mode is closed and the keyboard LEDs return to previous status.

   The video mode has been readjusted. Screen quality should be optimal. The CPU should now show the console monitor as the current screen, together with the available video resolutions.

   The DDC information of the console monitor was loaded once. Reloading is possible by repeating the operation.

7 Specifications

7.1 Interfaces

7.1.1 DVI-D Single Link

The video interface supports the DVI-D protocol. All signals that comply to DVI-D Single Link norm can be transmitted. This includes e.g. monitor resolutions such as 1920x1200@60Hz, Full HD (1080p) or 2K HD (up to 2048x1152). Data rate is limited to 165 MPixel/s.

7.1.2 DVI-I Single Link

The video interface supports the DVI-I protocol. All analog (VGA) or digital (DVI) signals that comply to DVI-I Single Link norm can be transmitted. This includes e.g. monitor resolutions such as 1920x1200@60Hz, Full HD (1080p) or 2K HD (up to 2048x1152). Data rate is limited to 165 MPixel/s.

7.1.3 USB-HID

Our devices with USB-HID interface support a maximum of two devices with USB-HID protocol. Each USB-HID port provides a maximum current of 100 mA.

Keyboard

Compatible with most USB keyboards. Certain keyboards with additional functions may require custom firmware to operate. Keyboards with an integral USB Hub (Mac keyboards e.g.) are also supported.

Mouse

Compatible with most 2-button, 3-button and scroll mice.

Other USB-HID devices

The proprietary USB emulation also supports certain other USB-HID devices, such as specific touch screens, graphic tablets, barcode scanners or special keyboards. Support cannot be guaranteed, however, for every USB-HID device.

Only two USB-HID devices are supported concurrently, such as keyboard and mouse or keyboard and touch screen. A hub is allowed, but it does not increase the number of HID devices allowed.
To support other USB 'non-HID' devices, such as scanners, web cams or memory devices, choose our devices with transparent USB support.

7.1.4 USB 2.0 (transparent)

KVM Extender models with transparent USB 2.0 support allow the connection of **all** types of USB 2.0 devices (without restriction). USB 2.0 data transfer is supported, depending on the upgrade module, with USB high speed (max. 480 Mbit/s) or USB Full Speed (max. 12 Mbits).

Each USB 2.0 port provides a maximum current of 500 mA (high power).

7.1.5 RJ45 (Interconnect)

The communication of the Cat X devices requires a 1000BASE-T connection.

Connector wiring must comply with EIA/TIA-568-B (1000BASE-T), with RJ45 connectors at both ends. All four cable wire pairs are used.

7.1.6 Fiber SFP Type LC (Interconnect)

The communication of fiber devices is performed via Gigabit SFPs that have to be connected to suitable fibers fitted with connectors type LC ().

The correct function of the device can only be guaranteed with SFPs provided by the manufacturer.

SFP modules can be damaged by electrostatic discharge (ESD).
➔ Please consider ESD handling specifications.

7.1.7 Serial Interface

The serial interface option supports a full-duplex transmission with a real hardware handshake up to a Baud rate of 19,200 Baud.

The CON Unit is cabled as DTE (Data Terminal Equipment, like CPU output) and can be connected directly to DCE devices (Data Communication Equipment).

- A touch screen can be connected directly to the CON Unit.
- To connect to a serial printer (or any other DTE instead of DCE device), you need a null modem cable (crossed cable) between CON Unit and the device.

Operation of several devices:

The serial interface transmits 6 signals (3 for each direction). Normally, 4 of the 6 signals are handshake signals (in addition to RxD and TxD).

The following configurations, however, can be realized using special adapter splitting cables:

- Three single 2-wire transmissions
- Two transmissions with a handshake signal
- A serial mouse and a single 2-wire transmission.

In this case, choose X-ON / X-OFF software handshake for traffic control at printer and PC.

Connection Format	DTE (Data Terminal Equipment)
Speed	Up to 19,200 Baud
Data Format	Format independent
Data Transmission	• RxD (Receive Data) • TxD (Transmit Data)
Traffic Control	The following signals are transmitted (hardware handshake): • RTS (Request To Send) • CTS (Clear To Send) • DTR (Data Terminal Ready) • DSR (Data Set Ready)

7.1.8 Analog Audio Interface

The analog audio option supports a bidirectional stereo audio transmission, in nearly CD quality.

The audio interface is a 'line level' interface and it is designed to transmit the signals of a sound card (or another 'line level' device) as well as to allow the connection of active speakers to the CON Unit.

Stereo audio can be transmitted bidirectionally at the same time.

Connection of a microphone:

Connect the microphone to the 'audio' input of the CON Unit. There are two ways to establish this connection:

- The output of the CPU Unit is connected with the microphone input of the sound card (red). Adjust the sound card to provide an additional amplification (20 dB).
- The output of the CPU Unit is connected to the audio input of the sound card (blue). Choose this connection if the microphone has its own pre-amplifier.

The CON Unit can do the pre-amplification of the microphone as well. Open the CON Unit, locate the 'MIC' jumper on the audio board and close the pins.

Specifications Analog Audio

Transmission Format	Digitized virtually CD quality audio (16 bit, 38.4 KHz)
Signal Level	Line-Level (5 Volt Pk-Pk maximum)
Input Impedance	47 KOhm
Connections CPU Unit	2x 3.5 mm stereo jack plug (audio in & audio out)
Connections CON Unit	2x 3.5 mm stereo jack plug (audio in & audio out)

Specifications Analog Audio USB 2.0

Transmission Format	Digitized virtually CD quality audio, 16 bit (8, 11.025, 16, 22.05, 32, 44.1, 48 KHz)
Signal Level	Line-Level (5 Volt Pk-Pk maximum)
Input Impedance	20 KOhm
Connections CPU Unit	1x USB type B female connector
Connections CON Unit	2x 3.5 mm stereo jack plug (audio in & audio out)

7.1.9 Digital Audio Interface

The digital audio option supports the unidirectional transmission of digital audio data.

Up to three sources can be connected to the CPU Unit. The active source is transmitted. If several sources are active, the XLR signal takes priority, otherwise the first active signal.

The three connectors on the CON Unit all concurrently provide digital audio.

KVM Extender with digital audio option include an inbuilt sample rate converter that allows to provide predefined sample frequencies at the output of the CON unit.

The user can set directly the following parameters by using a configuration file:

- Activate or deactivate sample rate converter in the Config.txt file on the flash drive of the KVM Extender.
- If the sample rate converter is activated, the following characteristics are valid:
  140 dB dynamic range and -120 dB total harmonic distortion + noise.
- Set sample frequency of the sample rate converter by writing the parameter in a new line. The following sample frequencies are available:
  - 32.0 kHz (write **SRC32000** in Config.txt file of the CPU unit)
  - 44.1 kHz (write **SRC44100** in Config.txt file of the CPU unit)
  - 48.0 kHz (write **SRC48000** in Config.txt file of the CPU unit)
  - 96.0 kHz (write **SRC96000** in Config.txt file of the CPU unit)
- To deactivate the sample rate converter, write **SRC_NONE** in the Config.txt file of the CPU unit.

Compatibility	AES/EBU, S/PDIF, EIAJ CP1201, IEC 60958
Standards	Dolby Digital, DTS, PCM
Bit Depth	24 bit
Sample Rate	32 to 96 kHz
CPU Unit (Inputs)	• Mini-XLR (AES/EBU; symmetrical, lockable) • Coaxial (S/PDIF; RCA, Cinch) • Optical (S/PDIF; TOSLINK)
CON Unit (Outputs)	• Mini-XLR (AES/EBU; symmetrical, lockable) • Coaxial (S/PDIF; RCA, Cinch) • Optical (S/PDIF; TOSLINK)

7.2 Interconnect Cable

7.2.1 Cat X

A point-to-point connection is required. Operation with several patch fields is possible. Routing over an active network component, such as an Ethernet Hub, Router or Matrix, is not allowed.

➔ Avoid routing Cat X cables along power cables.

➔ If the site has 3-phase AC power, try to ensure that CPU Unit and CON Unit are on the same phase.

To maintain regulatory EMC compliance, correctly installed shielded Cat X cable must be used throughout the interconnection link.

To maintain regulatory EMC compliance, all Cat X cables need to carry ferrites on both cable ends close to the device.

Type of Interconnect Cable

The KVM Extender requires interconnect cabling specified for Gigabit Ethernet (1000BASE-T). The use of solid-core (AWG24), shielded, Cat 5e (or better) is recommended.

Cat X Solid-Core Cable AWG24	S/UTP (Cat 5e) cable according to EIA/TIA-568-B. Four pairs of wires AWG24. Connection according to EIA/TIA-568-B (1000BASE-T).
Cat X Patch Cable AWG26/8	S/UTP (Cat 5e) cable according to EIA/TIA-568-B. Four pairs of wires AWG26/8. Connection according to EIA/TIA-568-B (1000BASE-T).

The use of flexible cables (patch cables) type AWG26/8 is possible, however the maximum possible extension distance is halved.

Maximum Acceptable Cable Length

Cat X Installation Cable AWG24	140 m (400 ft)
Cat X Patch Cable AWG26/8	70 m (200 ft)

7.2.2 Fiber

A point-to-point connection is necessary. Operation with multiple patch panels is allowed. Routing over active network components, such as Ethernet Hubs, Switches or Routers, is not allowed.

Type of Interconnect Cable

(Cable notations according to VDE)

Type of cable	Specifications
Single-mode 9µm	• Two fibers 9µm • I-V(ZN)H 2E9 (in-house patch cable) • I-V(ZN)HH 2E9 (in-house breakout cable) • I/AD(ZN)H 4E9 (in-house or outdoor breakout cable, resistant) • A/DQ(ZN)B2Y 4G9 (outdoor cable, with protection against rodents)
Multi-mode 50µm	• Two fibers 50µm • I-V(ZN)H 2G50 (in-house patch cable) • I/AD(ZN)H 4G50 (in-house or outdoor breakout cable, resistant)
Multi-mode 62.5µm	• Two fibers 62.5µm • I-V(ZN)HH 2G62,5 (in-house breakout cable) • A/DQ(ZN)B2Y 4G62,5 (outdoor cable, with protection against rodents)

Maximum Acceptable Cable Length

Type of cable	Maximum Acceptable Cable Length
Single-mode 9µm	10,000 m (32,800 ft)
Multi-mode 50µm (OM3)	1,000 m (3,280 ft)
Multi-mode 50µm	400 m (1,300 ft)
Multi-mode 62.5µm	200 m (650 ft)

If you use single-mode SFPs with multi-mode fibers, you normally can double the maximum acceptable cable length.

Type of Connector

Connector	LC Connector

7.3 Supported Peripherals

7.3.1 USB-HID Devices

The KVM Extender will support most USB-HID devices, including the vast majority of keyboards and mice currently on the market. Many other kinds of HID devices such as bar-code scanners and touch screens may also be compatible

It is not possible to guarantee support for all available USB-HID devices. In certain cases, custom firmware may be required.

USB-HID (and other) devices that are not supported as standard will normally operate with our devices featuring transparent USB support.

Please note that concurrent operation of more than two USB-HID devices is not possible even if you use a USB hub.

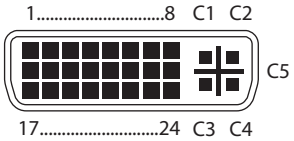
7.3.2 USB 2.0 Devices

KVM Extender models featuring a transparent USB 2.0 connection use Extreme USB Technology from Icron Technologies.

This technology supports **all** types of USB 2.0 devices, however the manufacturer cannot guarantee compatibility with every device on the market. Please contact your dealer if any issues are found.

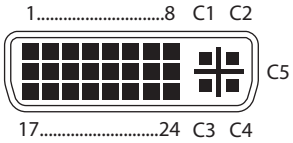
7.4 Connector Pinouts

Connector DVI-D Single-Link



Pin	Signal	Pin	Signal	Pin	Signal
1	T.M.D.S data 2 –	9	T.M.D.S data 1 –	17	T.M.D.S data 0 –
2	T.M.D.S data 2 +	10	T.M.D.S data 1 +	18	T.M.D.S data 0 +
3	T.M.D.S data 2 GND	11	T.M.D.S data 1 GND	19	T.M.D.S data 0 GND
4	n.c.	12	n.c.	20	n.c.
5	n.c.	13	n.c.	21	n.c.
6	DDC Input (SCL)	14	+5VDC high impedance	22	T.M.D.S clock GND
7	DDC Output (SDA)	15	GND	23	T.M.D.S clock +
8	Internal use	16	Hot Plug recognition	24	T.M.D.S clock –
C1	Internal use			C3	Internal use
C2	n.c.	C5	GND	C4	Internal use

Connector DVI-I Single-Link

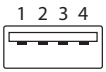


Pin	Signal	Pin	Signal	Pin	Signal
1	T.M.D.S data 2–	9	T.M.D.S data 1–	17	T.M.D.S data 0–
2	T.M.D.S data 2+	10	T.M.D.S data 1+	18	T.M.D.S data 0+
3	T.M.D.S data 2 GND	11	T.M.D.S data 1 GND	19	T.M.D.S data 0 GND
4	n.c.	12	n.c.	20	n.c.
5	n.c.	13	n.c.	21	n.c.
6	DDC Input (SCL)	14	+5VDC high impedance	22	T.M.D.S clock GND
7	DDC Output (SDA)	15	GND	23	T.M.D.S clock+
8	V-sync	16	Hot Plug recognition	24	T.M.D.S clock–
C1	Red signal			C3	Blue signal
C2	Green signal	C5	GND	C4	H-sync

Connector USB Type B

Picture	Pin	Signal	Color
	1	VCC (+5VDC)	Red
	2	Data –	White
	3	Data +	Green
	4	GND	Black

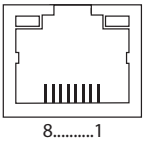
Connector USB Type A

Picture	Pin	Signal	Color
	1	VCC (+5VDC)	Red
	2	Data –	White
	3	Data +	Green
	4	GND	Black

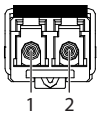
Connector Mini USB Type B

Picture	Pin	Signal	Color
	1	VCC (+5VDC)	Red
	2	Data –	White
	3	Data +	Green
	4	n.c.	–
	5	GND	Black

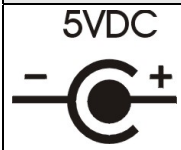
RJ45

Picture	Pin	Signal	Pin	Signal
	1	D1+	5	D3–
	2	D1–	6	D2–
	3	D2+	7	D4+
	4	D3+	8	D4–

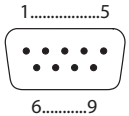
Fiber SFP Typ LC

Picture	Diode	Signal
	1	Data OUT
	2	Data IN

Power Supply

Picture	Pin	Signal
	Inside	VCC (+5VDC)
	Outside	GND

D-Sub 9 (Serial)

Picture	Pin	Signal	Pin	Signal
	1	n.c.	6	DTR
	2	CTS	7	TxD
	3	RTS	8	RxD
	4	DSR	9	n.c.
	5	GND		

3.5 mm Stereo Jack Plug

Picture	Pin	Signal
	1	GND
	2	Audio IN / OUT L
	3	Audio IN / OUT R

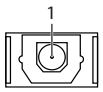
RCA (Cinch)

Picture	Pin	Signal
	1	GND
	2	Data IN / OUT

Mini-XLR

Picture	Pin	Signal
	1	GND
	2	Data +
	3	Data –

TOSLINK

Picture	Diode	Signal
	1	Data IN / OUT

7.5 Power Supply

Voltage	5VDC
Power Requirement (per Unit)	KVM Extender**:** • Single-Head devices: max. 800 mA • VGA: max. 900 mA **Upgrade Modules:** • Analog Audio / Serial: max. 300 mA • Digital Audio: max. 300 mA • USB-HID: max. 300 mA • USB 2.0 embedded: max. 1,100 mA • USB 2.0: max. 2,500 mA

7.6 Environmental Conditions

Operating Temperature	41 to 113°F (5 to 45°C)
Storage Temperature	–13 to 140°F (–25 to 60°C)
Relative Humidity	Max. 80% non-condensing

7.7 Size

Devices in the 2-fold Vario Chassis 1

CPU Unit / CON Unit	145 x 147 x 41 mm (5.7" x 5.8" x 1.7")
Shipping Box	210 x 140 x 165 mm (8.3" x 5.5" x 6.5")

Devices in the 2-fold Vario Chassis 2

CPU Unit / CON Unit	221 x 147 x 41 mm (8.7" x 5.8" x 1.7")
Shipping Box	550 x 365 x 115 mm (21.7" x 14.4" x 4.5")

Devices in the 4-fold Vario Chassis

CPU Unit / CON Unit	293 x 147 x 41 mm (11.5" x 5.8" x 1.7")
Shipping Box	550 x 365 x 115 mm (21.7" x 14.4" x 4.5")

Devices in the 6-fold Vario Chassis

CPU Unit / CON Unit	442 x 147 x 41 mm (17.4" x 5.8" x 1.7")
Shipping Box	760 x 365 x 115 mm (29.9" x 14.4" x 4.5")

Devices in the 21-fold Vario Chassis

CPU Unit / CON Unit	482 x 462 x 176 mm (19.0" x 18.2" x 6.3")
Shipping Box	645 x 574 x 368 mm (25.4" x 22.6" x 14.5")

7.8 Shipping Weight

Devices in the 2-fold Vario Chassis 1

CPU Unit / CON Unit	0.4 kg (0.9 lb)
Shipping Box	2.2 kg (4.9 lb)

Devices in the 2-fold Vario Chassis 2

CPU Unit / CON Unit	0.8 kg (1.8 lb)
Shipping Box	2.6 kg (5.7 lb)

Devices in the 4-fold Vario Chassis

CPU Unit / CON Unit	0.9 kg (2.0 lb)
Shipping Box	3.4 kg (7.5 lb)

Devices in the 6-fold Vario Chassis

CPU Unit / CON Unit	1.4 kg (3.1 lb)
Shipping Box	4.6 kg (10.1 lb)

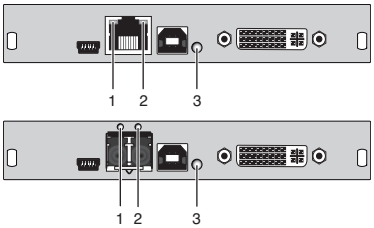
Devices in the 21-fold Vario Chassis

CPU Unit / CON Unit	10.0 kg (22.1 lb)
Shipping Box	14.5 kg (32.0 lb)

8 Troubleshooting

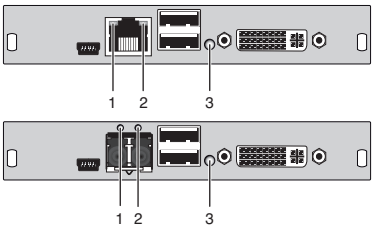
8.1 Blank Screen

CPU Module



Rear View

CON Module

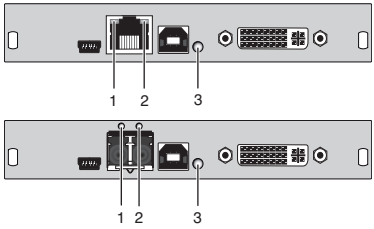


Rear View

Diagnosis	Possible Reason	Measure
LED **3** off	Power supply	➔ Check power supply units and the connection to the power network.
LED **1** on or LED **2** off	Connection between CON Unit and CPU Unit	➔ Check interconnect cables and connections.
CPU Unit: LED **3** red or yellow	No video signal detected by source (computer, CPU)	➔ Check DVI-D cable to CPU ➔ Download DDC information from console monitors (see Chapter 6.1, Page 43). Reboot CPU if necessary.
CON Unit: LED **3** red or yellow	No monitor detected	➔ Check connection, length and quality of the DVI-D cable to monitor, tighten cable thumbscrews.
	No video signal detected from CPU Unit	➔ Check connection, length and quality of interconnect cables between the units. ➔ Download DDC information from console monitors (see Chapter 6.1, Page 43). Reboot CPU if necessary.

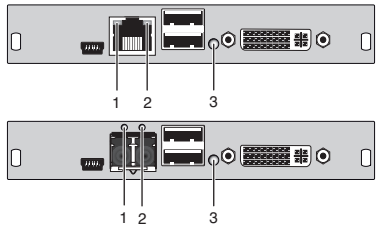
8.2 USB-HID

CPU Module



Rear View

CON Module



Rear View

Diagnosis	Possible Reason	Measure
Keyboard LEDs **Shift** and **Scroll** are blinking	Keyboard in Command Mode	➔ Press <Esc> to leave Command Mode.
CPU Unit: LED **3** green or violet	No USB connection to CPU	➔ Check connection of USB cable to CPU; select another USB port if necessary. ➔ Remove USB and power cable and restart CPU. Connect power cable first.
CON Unit: LED **3** green or violet	Problems with USB connection	➔ Check connection of USB cable to USB-HID device. ➔ Remove DVI and power cable and restart CON Unit. Connect power cable first.
USB device without function	No USB-HID device	➔ Connect USB-HID device.
	USB-HID device is not supported	➔ Contact dealer if necessary.

8.3 Serial Connection

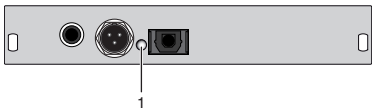
Diagnosis	Possible Reason	Measure
Serial device not operational	Settings of the serial interface	➔ Check Baud rate and general settings.
	No serial connection to CPU	➔ Check connection via serial cable.
	No serial connection to end device (e.g. touch screen, keyboard)	➔ Connect serial end device and switch it on. ➔ Check connection via serial cable.
Touch screen not operational	Hardware handshake	➔ Adjust serial interface to X-ON / X-OFF software handshake.

8.4 Analog Audio

Diagnosis	Possible Reason	Measure
CON Unit: No signal at audio output	No audio connection to CPU / audio source	➔ Connect analog audio source. ➔ Check audio cable.
	No Signal	➔ Switch analog audio source on. ➔ Activate analog output at CPU / audio source.
	No audio connection to audio sink (e.g. speakers)	➔ Connect analog audio sink and switch it on. ➔ Check connection of audio cable.
CPU Unit: No signal at audio output (microphone)	No audio connection to audio source (microphone)	➔ Connect analog audio source (microphone). ➔ Check connection of audio cable.
	No signal	➔ Switch analog audio source on. ➔ Activate analog output at audio source.
	No audio connection to audio sink (e.g. CPU)	➔ Check connection to CPU. ➔ Check connection of audio cable. ➔ Check audio configuration.

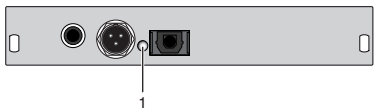
8.5 Digital Audio

CPU Module



Rear View

CON Module

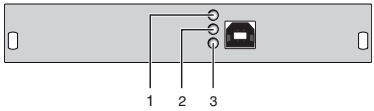


Rear View

Diagnosis	Possible Reason	Measure
CPU Unit: LED **1** red	No audio connection to CPU / audio source	➔ Connect digital audio source. ➔ Check connection of audio cable.
	No signal	➔ Switch digital audio source on. ➔ Activate digital output at CPU / audio source.
CON Unit: LED **1** red	No audio connection to audio sink (e.g. speakers)	➔ Connect digital audio sink. ➔ Check connection of audio cable.
	No signal	➔ Check signal at CPU Unit.
No signal / LEDs **1** OK	Digital Silence at active audio source	➔ Check LEDs at CPU Unit. ➔ Check audio format. ➔ Change audio input.

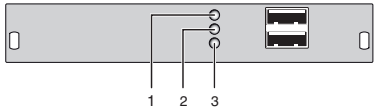
8.6 Upgrade Module USB-HID

CPU Module



Rear View

CON Module

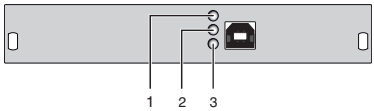


Rear View

Diagnosis	Possible Reason	Measure
LED **1** / **2** off	Device at higher / lower USB-HID port not detected	➔ Check connection of USB cable to USB-HID device. ➔ Connect USB-HID device. ➔ Contact dealer if necessary.
CPU Unit: LED **3** off	Connection between CON Unit and CPU Unit	➔ Check interconnect cable and connectors.
CON Unit: LED **3** off	Keyboard in Command Mode	➔ Press <Esc> to leave Command Mode.
CON Unit: LED **3** flashing slowly	Connection between CON Unit and CPU Unit	➔ Check interconnect cable and connections.
	Keyboard in Command Mode	➔ Press <Esc> to leave Command Mode.

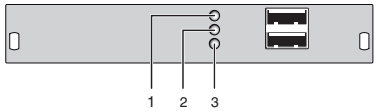
8.7 USB 2.0 embedded

CPU Module



Rear View

CON Module

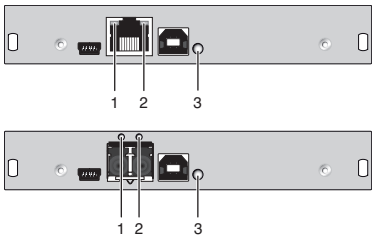


Rear View

Diagnosis	Possible Reason	Measure
CPU & CON Unit: LED **3** off	No connection to CPU	➔ Check connection USB cable to CPU; select another USB port if necessary. ➔ Remove USB and power cable and restart CPU. Connect power cable first.
CPU & CON Unit: LED **2** off	No connection between CON Unit and CPU Unit	➔ Check interconnect cable and connectors.
CPU & CON Unit: LED **2** off and USB 2.0 device without function	No USB 2.0 device	➔ Connect USB 2.0 device.
	USB 2.0 device is not supported	➔ Check installation at the CPU, also the necessary drivers. ➔ New connection of the USB 2.0 device. ➔ Ggf. Händler kontaktieren.

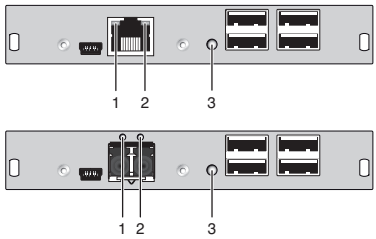
8.8 USB 2.0

CPU Module



Rear View

CON Module



Rear View

Diagnosis	Possible Reason	Measure
CPU Unit: All LEDs off	No connection to CPU	➔ Check connection USB cable to CPU; select another USB port if necessary. ➔ Remove USB and power cable and restart CPU. Connect power cable first.
CON Unit: LED **3** red	Connection between CON Unit and CPU Unit	➔ Check interconnect cable and connectors.
CON Unit: LED **3** flashing green / light blue and USB 2.0 device without function	No USB 2.0 device	➔ Connect USB 2.0 device.
	USB 2.0 device is not supported	➔ Check installation at the CPU, also the necessary drivers. ➔ New connection of the USB 2.0 device. ➔ Contact dealer if necessary.

9 Technical Support

Prior to contacting support please ensure you have read this manual, and then installed and set-up your KVM Extender as recommended.

9.1 Support Checklist

To efficiently handle your request it is necessary to complete our checklist for support and problem cases (Download). Keep the following information available before you call:

- Company, name, phone number and email
- Type and serial number of the device (see bottom of device)
- Date and number of sales receipt, name of dealer if necessary
- Issue date of the existing manual
- Nature, circumstances and duration of the problem
- Involved components (such as graphic source/CPU, OS, graphic card, monitor, USB-HID/USB 2.0 devices, interconnect cable) including manufacturer and model number
- Results from any testing you have done

9.2 Shipping Checklist

1. To return your device, contact your dealer to obtain a RMA number (Return-Material-Authorization).
2. Package your devices carefully, preferably using the original box. Add all pieces which you received originally.
3. Note your RMA number visibly on your shipment.

Devices that are sent in without a RMA number cannot be accepted. The shipment will be sent back without being opened, postage unpaid.

10 Certificates

10.1 CE Declaration Of Conformity

The products listed below in the form as delivered comply with the provisions of the following European Directives:

2004/108/EG Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility

CE Marking 2009

Product list:

K474 Series

The products comply with the following harmonized standards for Information Technology Equipment:

- EN 55022:2006 + A1:2007 (Class A)
- EN 55024:1998 + A1:2001 + A2:2003

This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety instructions and installation guidelines noted in this manual shall be considered in detail. Compliance with the specifications for cable lengths and types is mandatory.

Manufacturer:

IHSE GmbH
Maybachstrasse 11
88094 Oberteuringen
Deutschland

Oberteuringen, 26 January 2010

The Management

Use in a Domestic Environment

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

10.2 North American Regulatory Compliance

This equipment has been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Shielded cables must be used with this equipment to maintain compliance with radio frequency energy emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.

All power supplies are certified to the relevant major international safety standards.

10.3 WEEE

The manufacturer complies with the EU Directive 2012/19/EU on the prevention of waste electrical and electronic equipment (WEEE).

The device labels carry a respective marking.

10.4 RoHS

This device complies with the Directive 2011/65/EU of the European Parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The device labels carry a respective marking.

11 Glossary

The following terms are commonly used in this guide or in video and KVM technology:

Term	Explanation
AES/EBU	Digital audio standard that is officially known as AES3 and that is used for carrying digital audio signals between devices.
Cat X	Any Cat 5e (Cat 6, Cat 7) cable
CGA	The Color Graphics Adapter (CGA) is an old analog graphic standard with up to 16 displayable colors and a maximum resolution of 640x400 pixels.
Component Video	The Component Video (YPbPr) is a high-quality video standard that consists of three independently and separately transmittable video signals, the luminance signal and two color difference signals.
Composite Video	The Composite Video is also called CVBS and it is part of the PAL TV standard.
CON Unit	Component of a KVM Extender or Media Extender to connect to the console (monitor(s), keyboard and mouse; optionally also with USB 2.0 devices)
CPU Unit	Component of a KVM Extender or Media Extender to connect to a source (computer, CPU)
DDC	The Display Data Channel (DDC) is a serial communication interface between monitor and source (computer, CPU). It allows a data exchange via monitor cable and an automatic installation and configuration of a monitor driver by the operating system.
Dual Access	A system to operate a source (computer, CPU) from two consoles
Dual-Head	A system with two video connections
Dual Link	A DVI-D interface for resolutions up to 2560x2048 by signal transmission of up to 330 MPixel/s (24-bit)
DVI	Digital video standard, introduced by the Digital Display Working Group (http://www.ddwg.org). Single Link and Dual Link standard are distinguished. The signals have TMDS level.

Term	Explanation
DVI-I	A combined signal (digital and analog) that allows running a VGA monitor at a DVI-I port – in contrast to DVI-D (see DVI).
Fiber	Single-mode or multi-mode fiber cables
EGA	The Enhanced Graphics Adapter (EGA) is an old analog graphic standard, introduced by IBM in 1984. A D-Sub 9 connector is used for connection.
Console	Keyboard, mouse and monitor
CVBS	The analog color video baseband signal (CVBS) is also called Composite Video and it is part of the PAL TV standard.
KVM	Keyboard, video and mouse
Mini-XLR	Industrial standard for electrical plug connections (3 pole) for the transmission of digital audio and control signals
Multi-mode	62.5µ multi-mode fiber cable or 50µ multi-mode fiber cable
OSD	The On-Screen-Display is used to display information or to operate a device.
Quad-Head	A system with four video connections
RCA (Cinch)	A not standardized plug connection for transmission of electrical audio and video signals, especially with coaxial cables
SFP	SFPs (Small Form Factor Pluggable) are pluggable interface modules for Gigabit connections. SFP modules are available for Cat X and fiber interconnect cables.
S/PDIF	A digital audio interconnect that is used in consumer audio equipment over relatively short distances.
Single-Head	A system with one video connection
Single Link	A DVI-D interface for resolutions up to 1920x1200 by signal transmission of up to 165 MPixel/s (24-bit). Alternative frequencies are Full HD (1080p), 2K HD (2048x1080) and 2048x1152.
Single-mode	9µ single-mode fiber cable
S-Video (Y/C)	The S-Video (Y/C) is a video format transmitting luminance and chrominance signals separately. Thereby it has a higher quality standard than CVBS.

Term	Explanation
TOSLINK	Standardized fiber connection system for digital transmission of audio signals (F05 plug connection)
Triple-Head	A system with three video connections
USB-HID	USB-HID devices (Human Interface Device) allow for data input. There is no need for a special driver during installation; "New USB-HID device found" is reported. Typical HID devices include keyboards, mice, graphics tablets and touch screens. Storage, video and audio devices are **not** HID.
VGA	Video Graphics Array (VGA) is a computer graphics standard with a typical resolution of 640x480 pixels and up to 262,144 colors. It can be seen as a follower of the graphics standards MDA, CGA and EGA.